



City of Chicago Department of Water Management

Presentation to Chicago Metropolitan Agency for Planning

February 2009

John F. Spatz Jr., Commissioner



Water & Sewer System Overview

Protecting public health & safety

- 2 Water Intake Cribbs
- 2 Water Treatment Plants
- 12 Water Pumping Stations
- 4,200 Miles of Distribution Mains
- 4,400 Miles of Sewer Mains
- 263,000 Catch & Valve Basins
- 47,600 Fire Hydrants
- Serves City & 125 suburbs (~44% of IL)
- Serves 5.42 million people





Water System Facilities Overview



Dever and Harrison Crib

Dunne and 68th Street Crib





Water System Facilities Overview

*South Water Filtration
Plant 16 ft. Intake
Tunnel 1947*





Water System Facilities Overview



*Jardine Water Purification Plant
(1964 in service)*

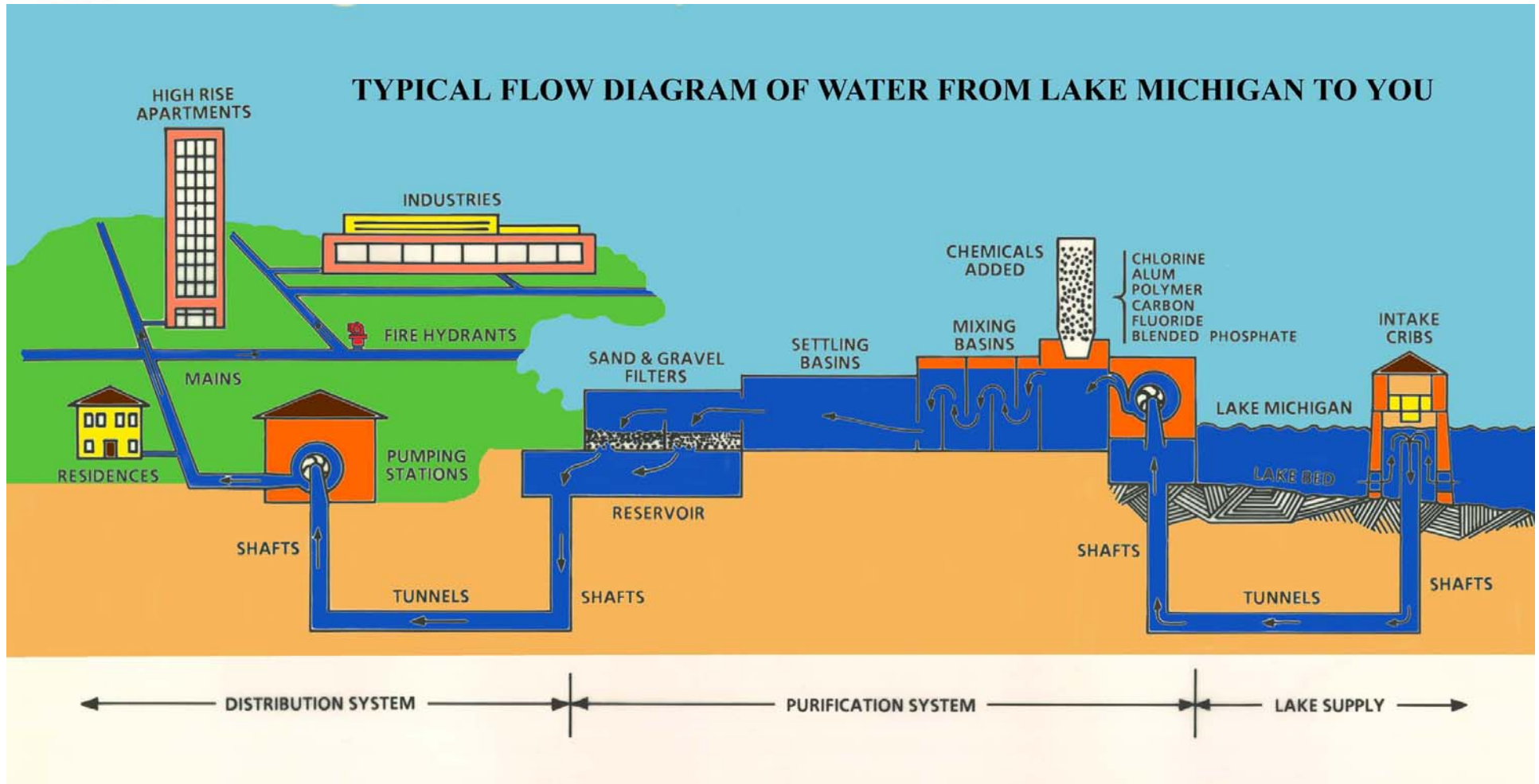
**World's 2 largest
conventional treatment
plants**

*South Water Purification Plant
(1947 in service)*



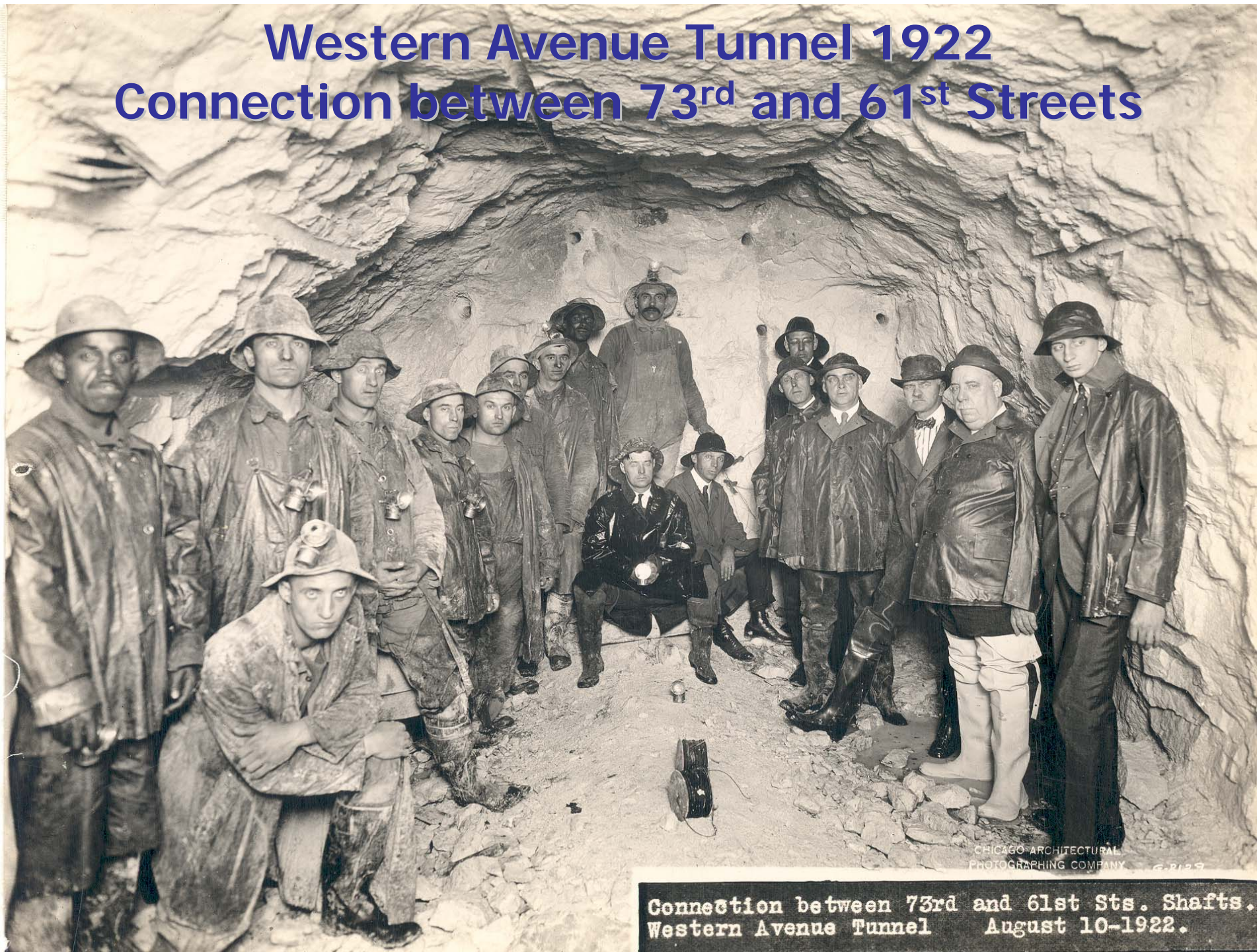


Water Flow Diagram



Western Avenue Tunnel 1922

Connection between 73rd and 61st Streets

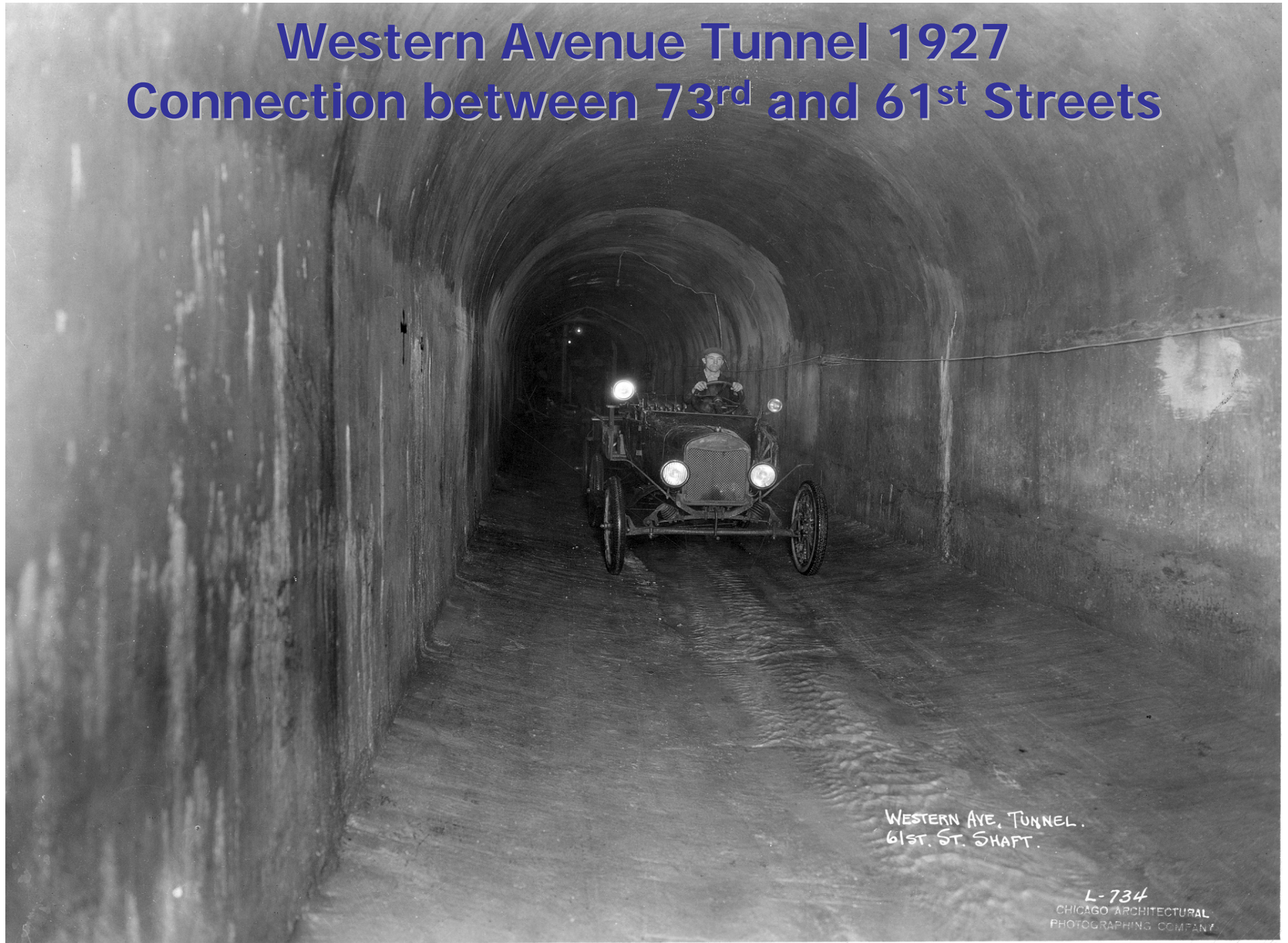


CHICAGO ARCHITECTURAL
PHOTOGRAPHING COMPANY 6-2123

Connection between 73rd and 61st Sts. Shafts.
Western Avenue Tunnel August 10-1922.

Western Avenue Tunnel 1927

Connection between 73rd and 61st Streets



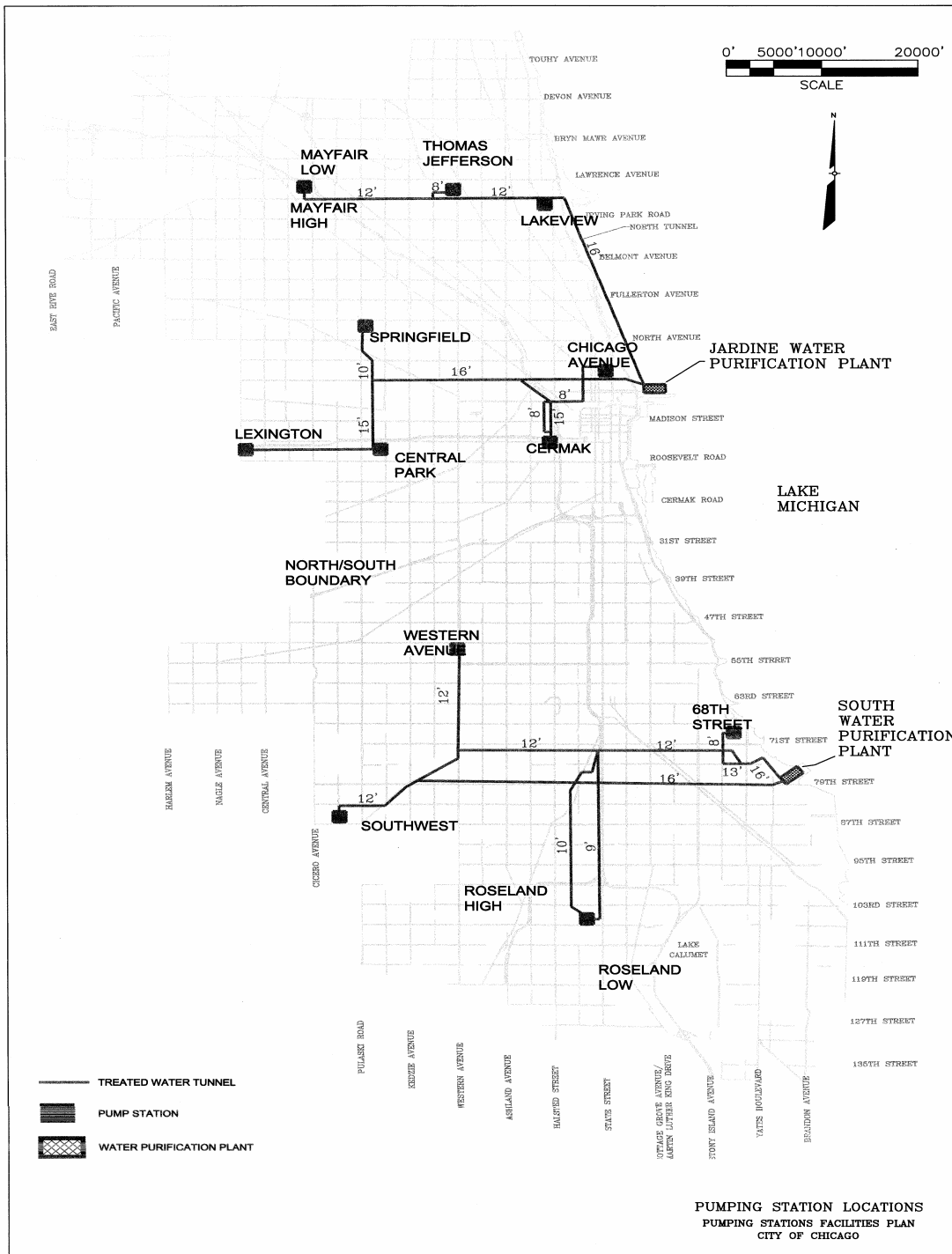
WESTERN AVE. TUNNEL.
61ST ST. SHAFT.

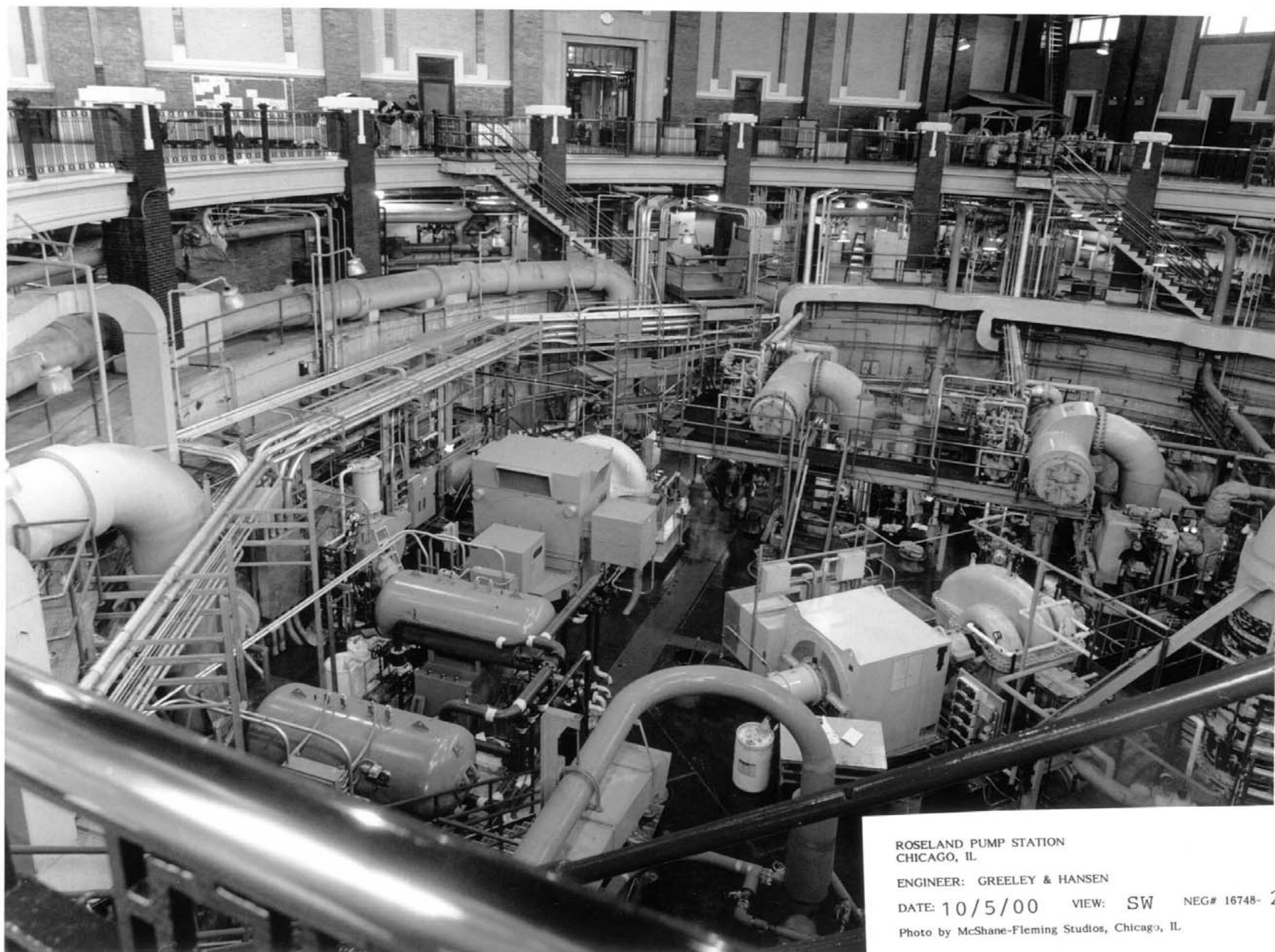
L-734
CHICAGO ARCHITECTURAL
PHOTOGRAPHING COMPANY



Finished Water Tunnel System

- North and Central Zones served by the Jardine Water Purification Plant
- South Zone served by the South Water Purification Plant
- Constructed in limestone bedrock about 120 feet below grade
- 8-16 feet diameter
- Total of 58 miles of tunnels





ROSELAND PUMP STATION
CHICAGO, IL

ENGINEER: GREELEY & HANSEN

DATE: 10/5/00 VIEW: SW NEG# 16748- 278

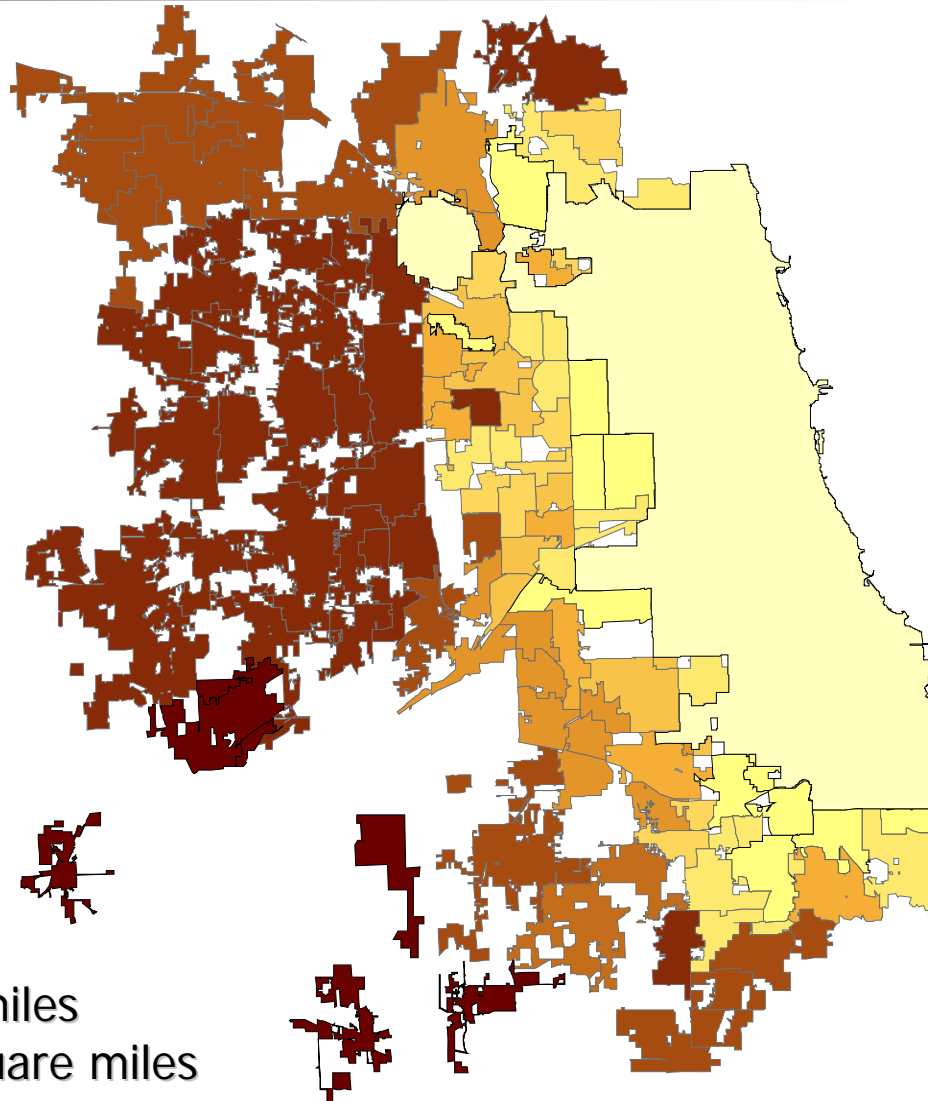
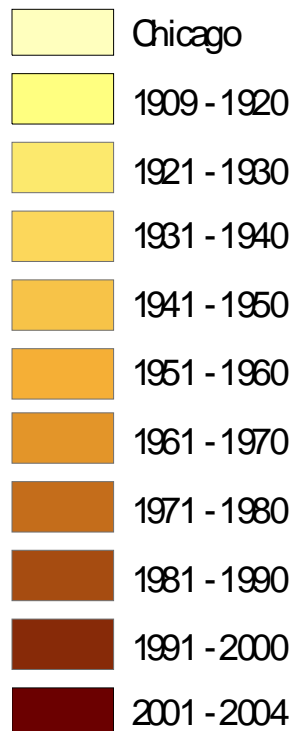
Photo by McShane-Fleming Studios, Chicago, IL



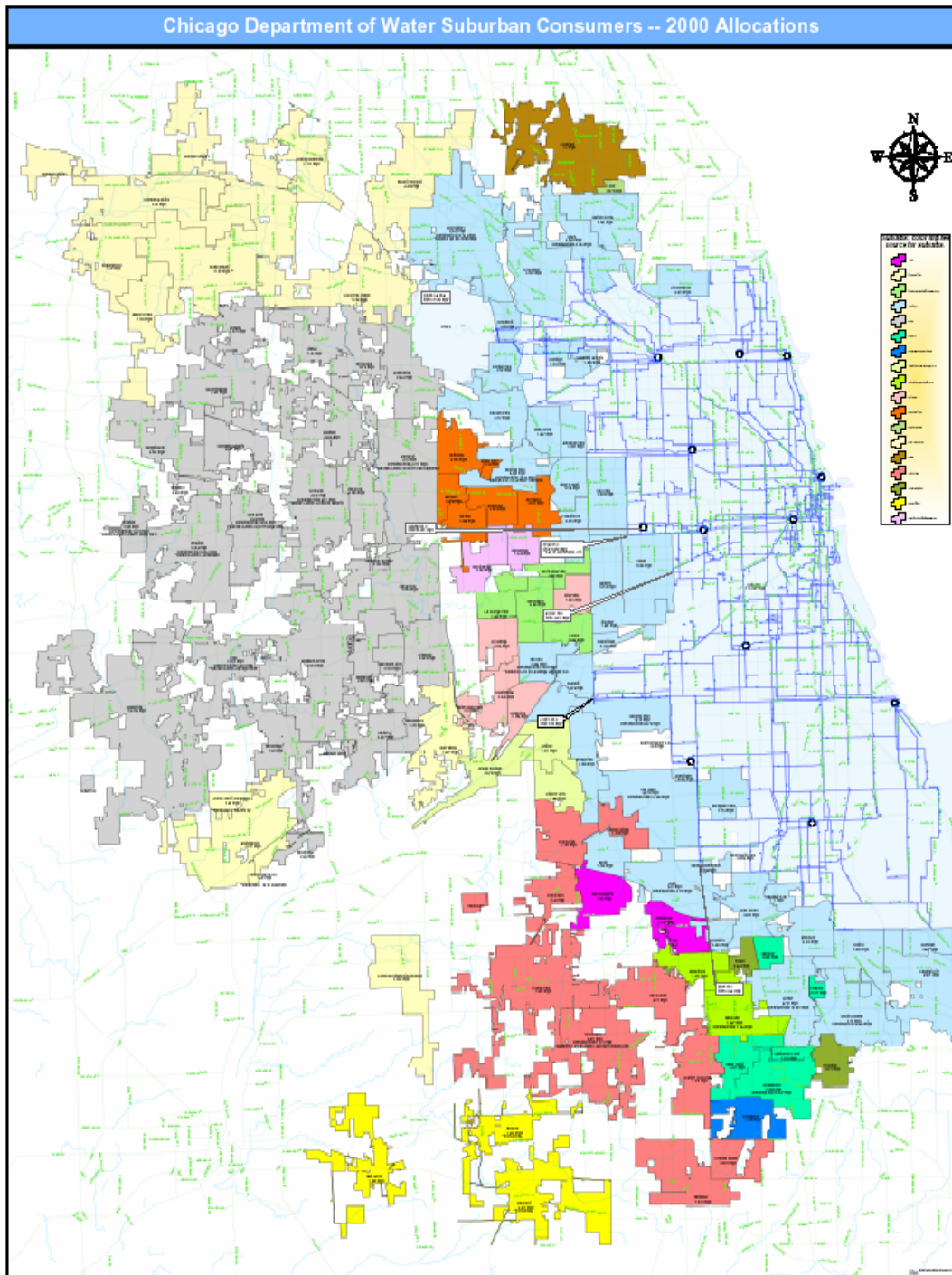


Chicago Suburban Growth

Legend



Currently Chicago has 228 square miles
Wholesale Service Area has 578 square miles



Water Supply Area



- Serves over 5.4 million people (44% of Illinois – 806 sq mi)
- City of Chicago – 2.9 million people – 228 sq mi
- Serves 48 municipalities that have a direct connection to us
- 125 Suburban Communities – 2.5 million people – 578 sq mi



Chicago's rate structure



Explanation of Rates

- As a result of state statute & prior litigation, the directly connected suburbs pay the *same rate* as Chicago residents
- Current water rate structure
 - Metered customers: *flat rate* of \$1.76 per 1,000 gallons
 - Non-metered customers: assessment based upon the width of the lot & building, # of stories of the building, # of fixtures



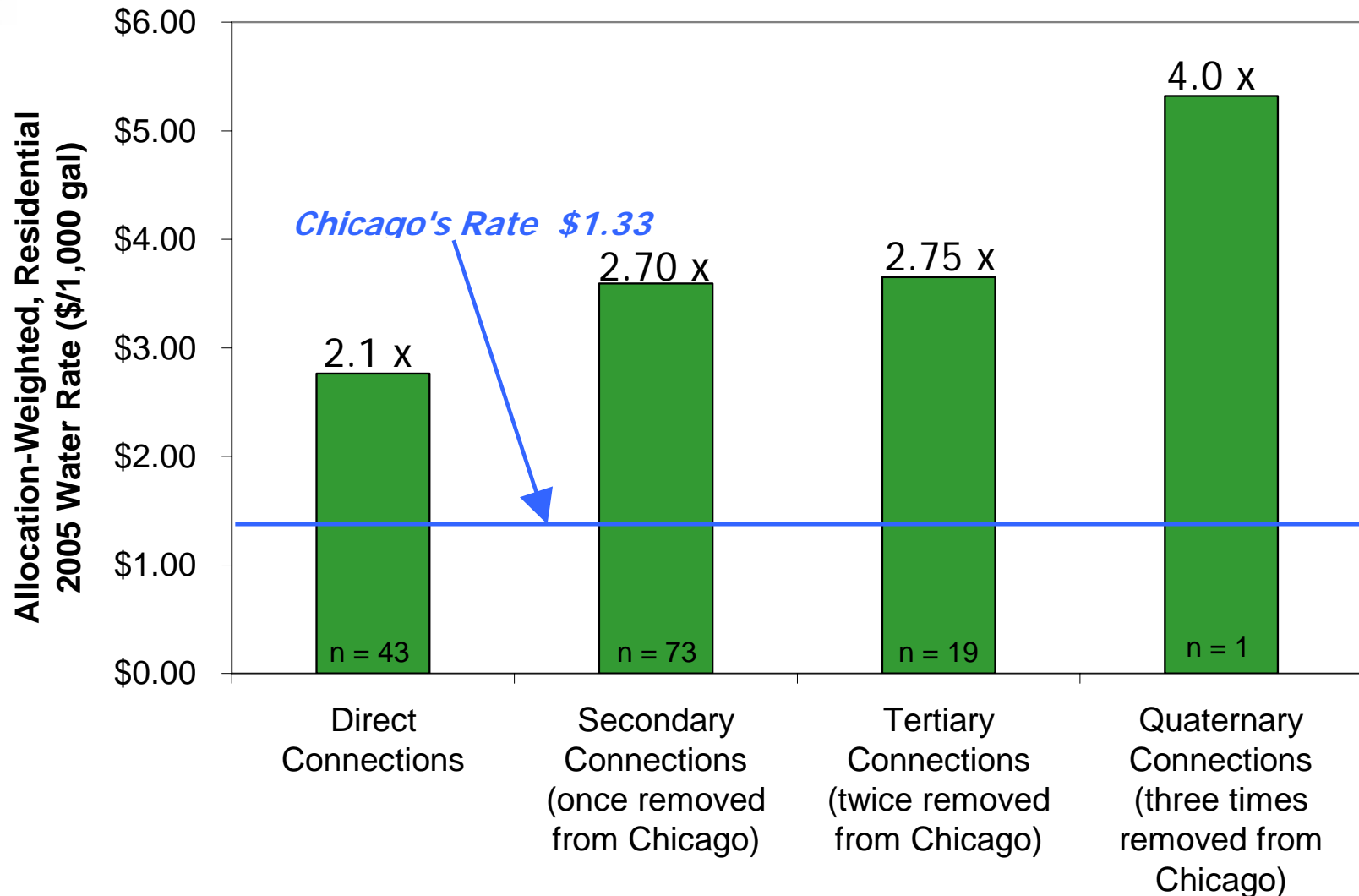
Water Rate Structure

- Cost of 1000 gals of water
 - 2007: \$1.33
 - Jan. 2008: \$1.53 (15%)
 - Jan. 2009: \$1.76 (15%)
 - Jan. 2010: \$2.00 (14%)

- Sewer rate (for City residents) will increase from 83% to:
 - Jan. 2008: 84%
 - Jan. 2009: 85%
 - Jan. 2010: 86%

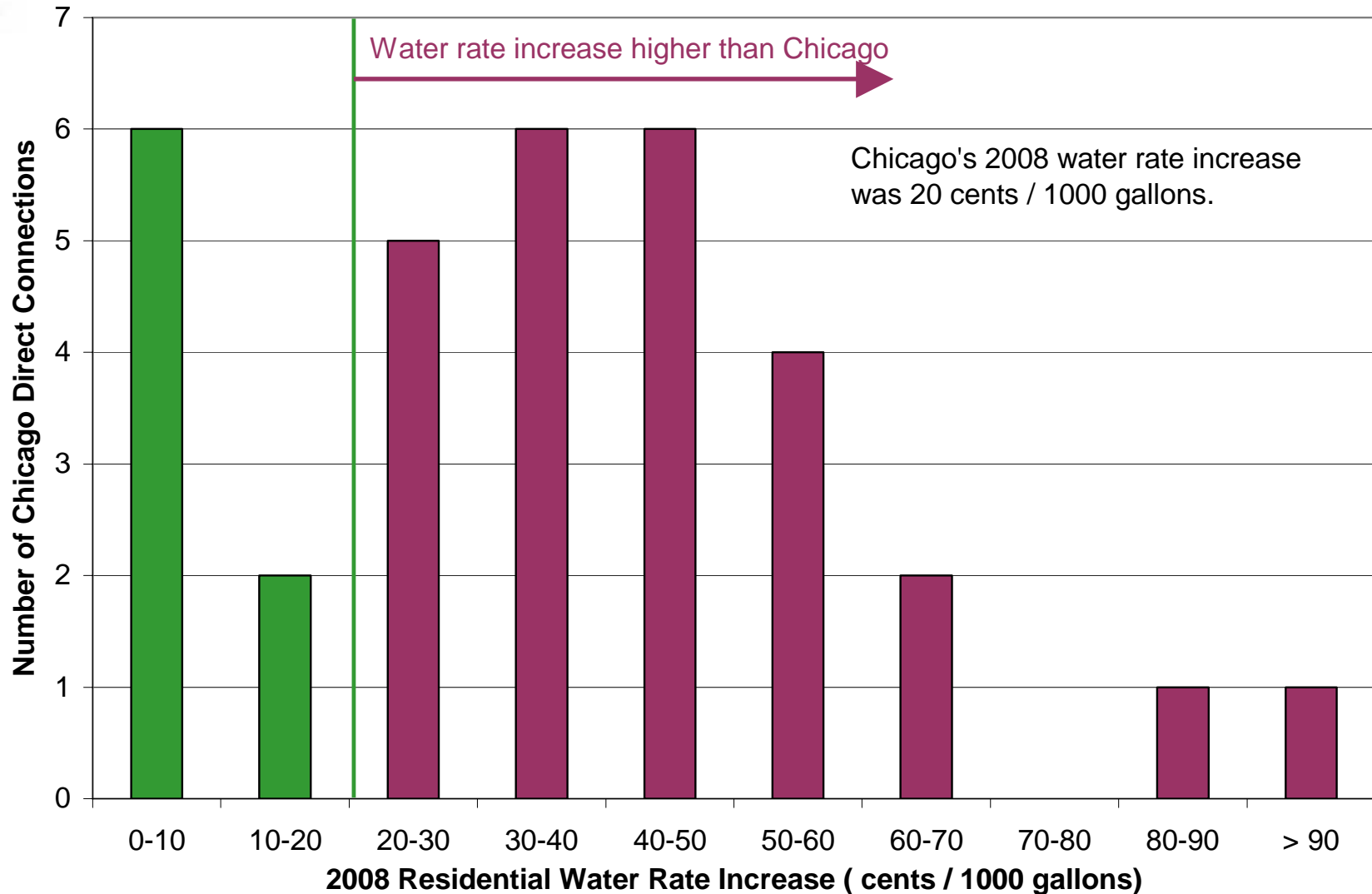


Chicago 2005 Connections' Rates





2008 Connections' Rate Increases



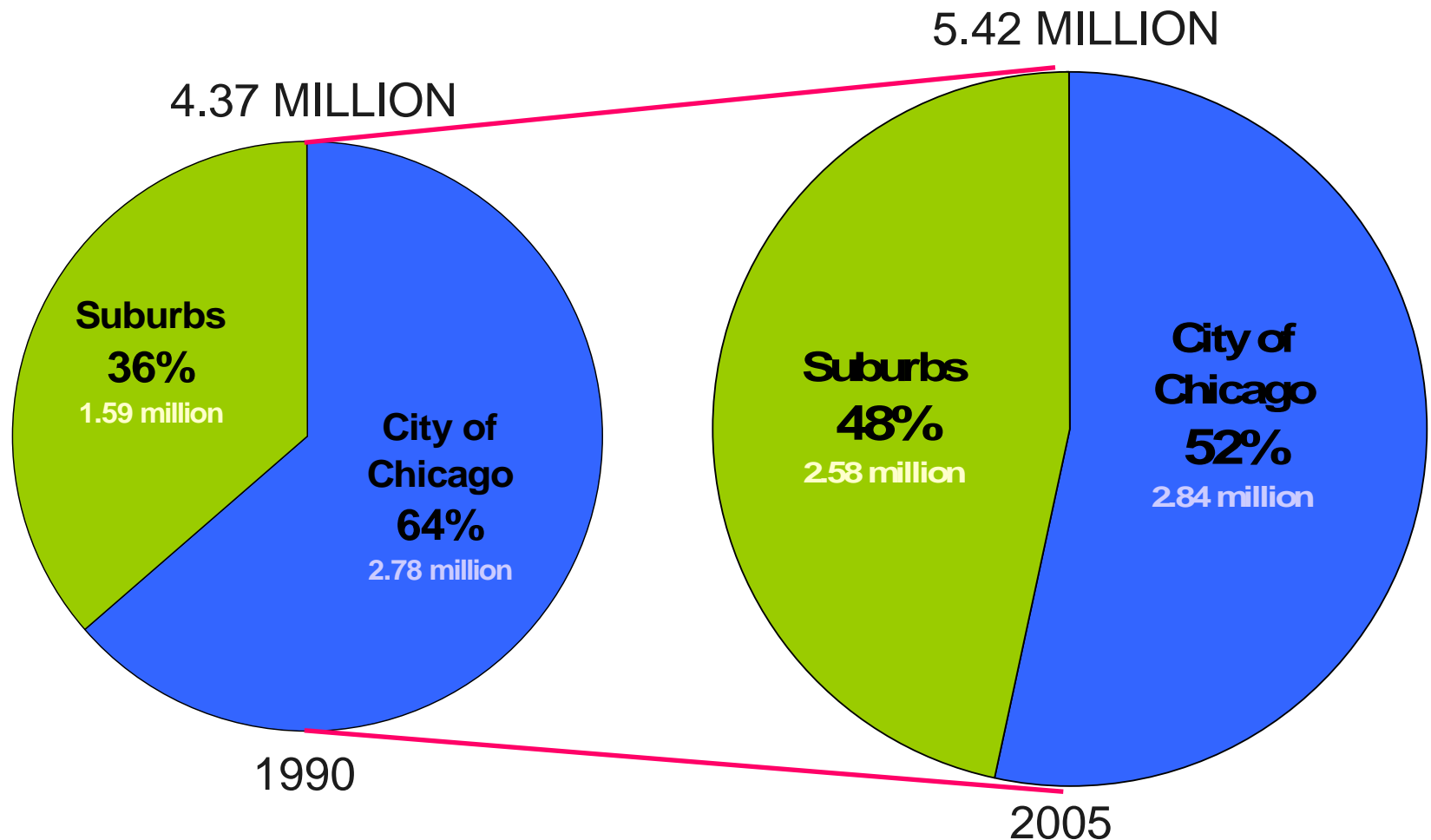


Demographics



Demographic Trends

Population Served



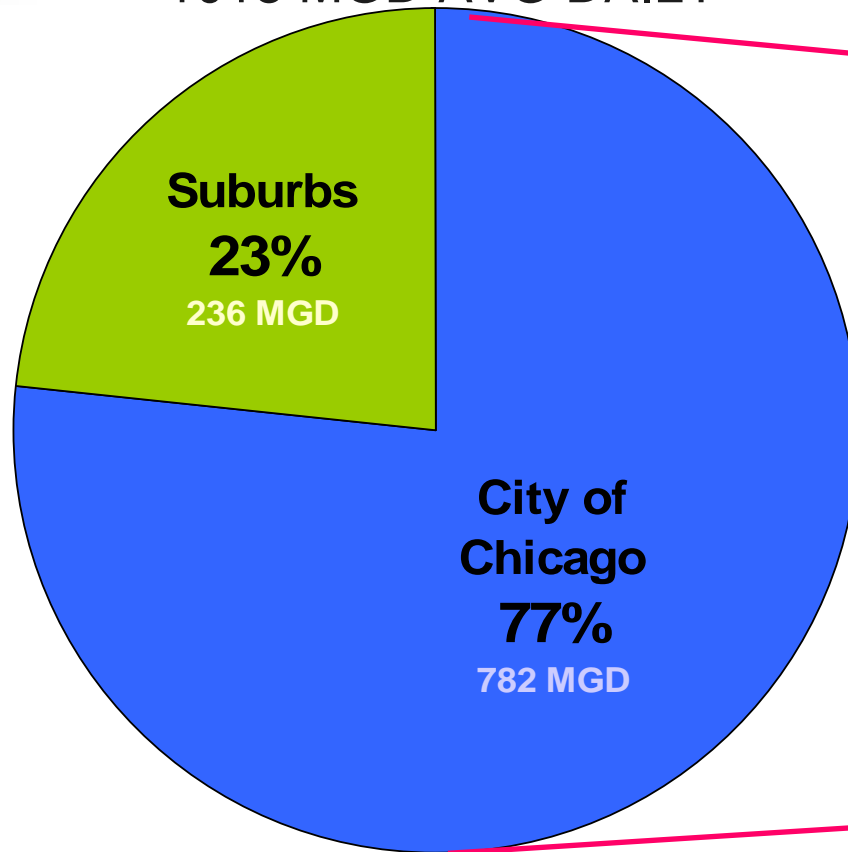
Overall population: ↑ 24% from 1990 - 2005



Consumption

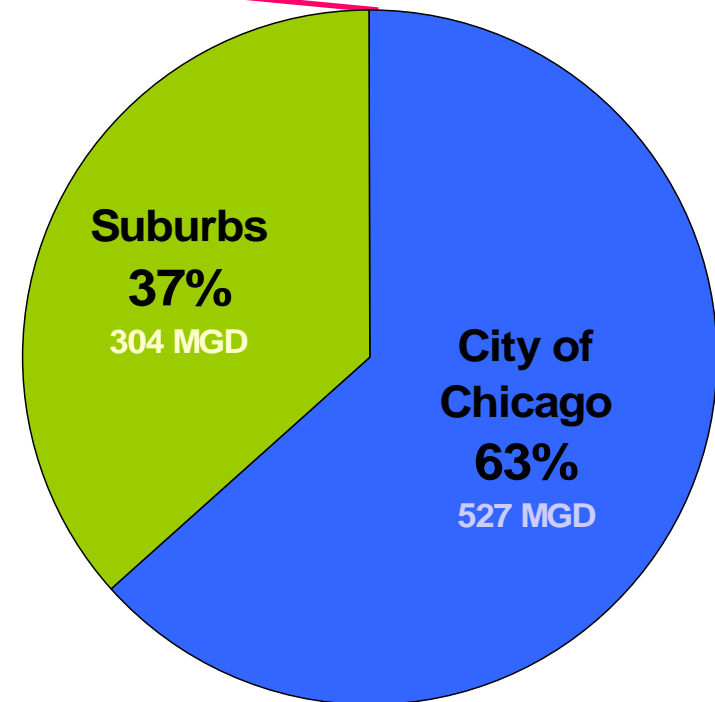
in million gallons per day

1018 MGD AVG DAILY



1990

831 MGD AVG DAILY



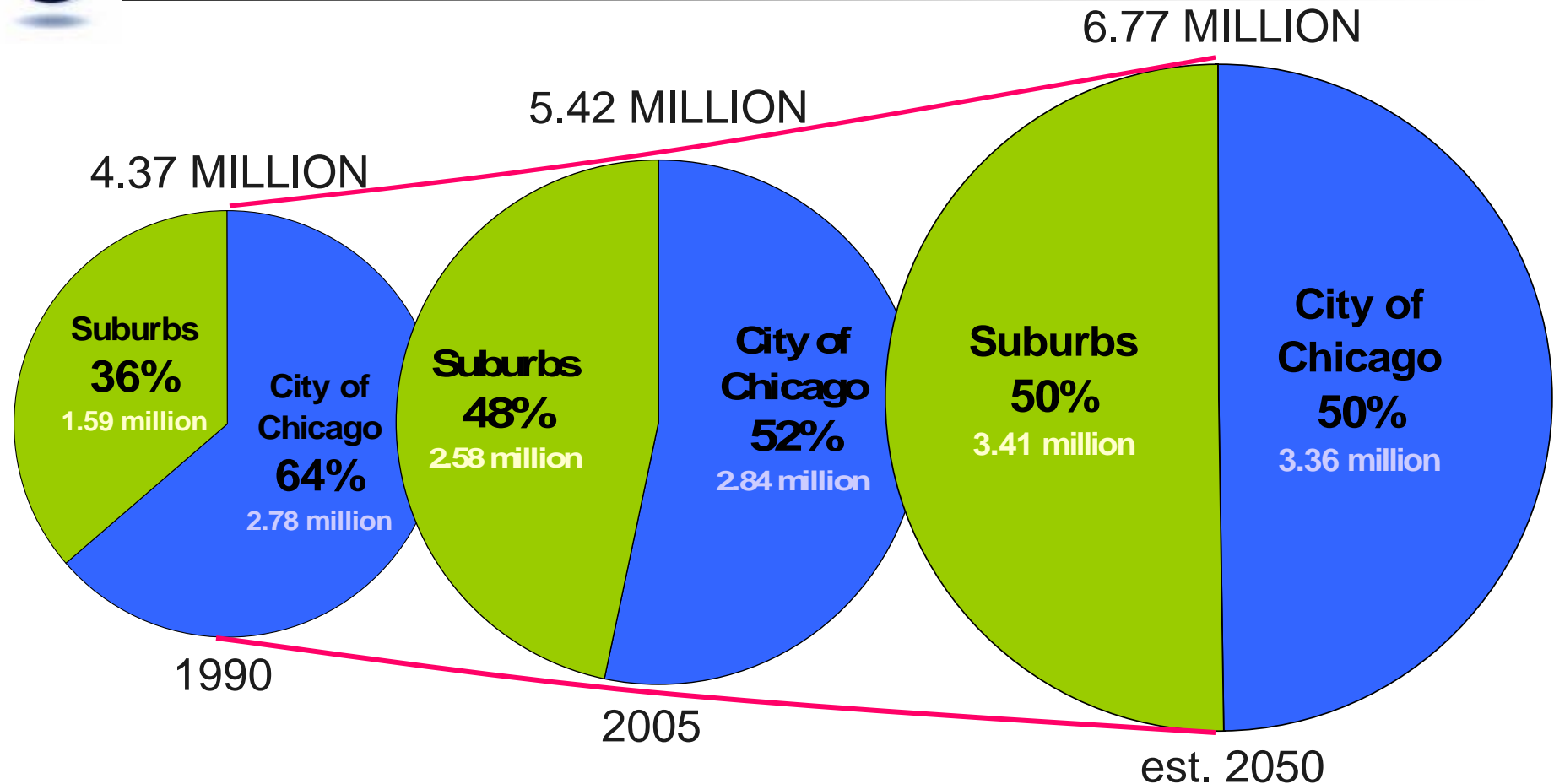
2008

City Consumption: ↓ 32% since 1990

Overall Consumption: ↓ 18% since 1990



...but more growth projected



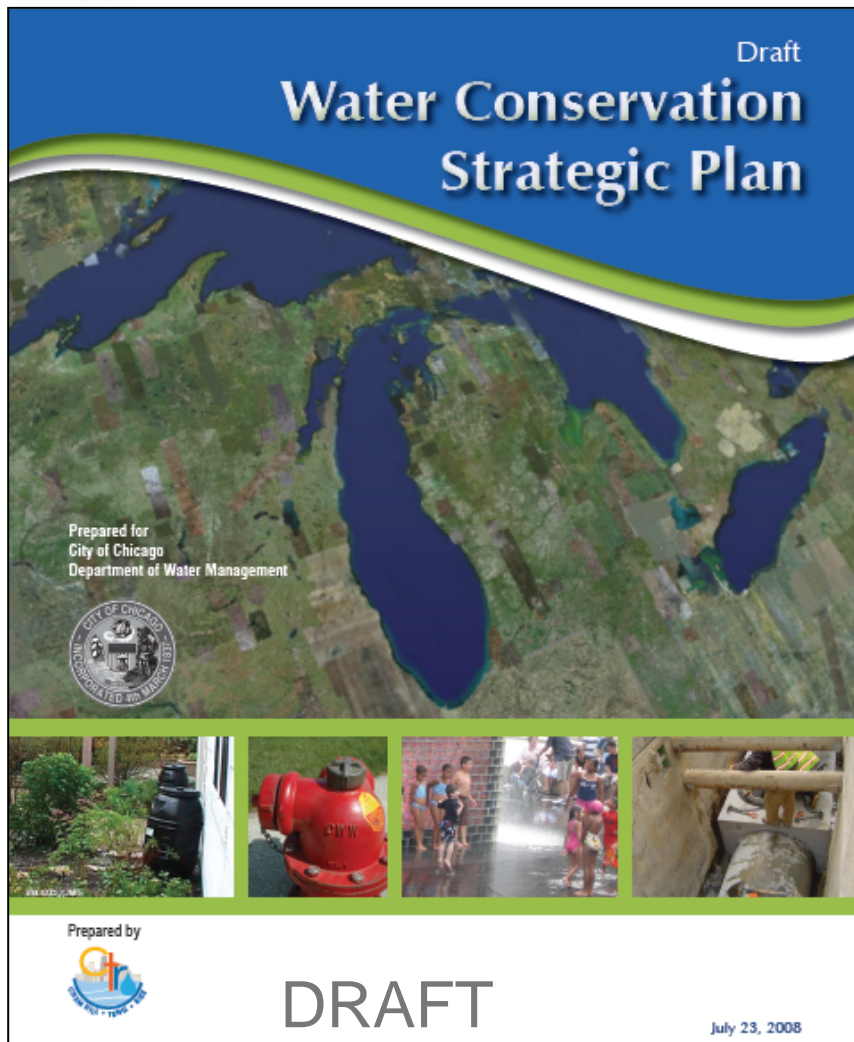
Overall population served:  1.3 million from 2005 - 2050



**We have a plan to
address future water
needs**



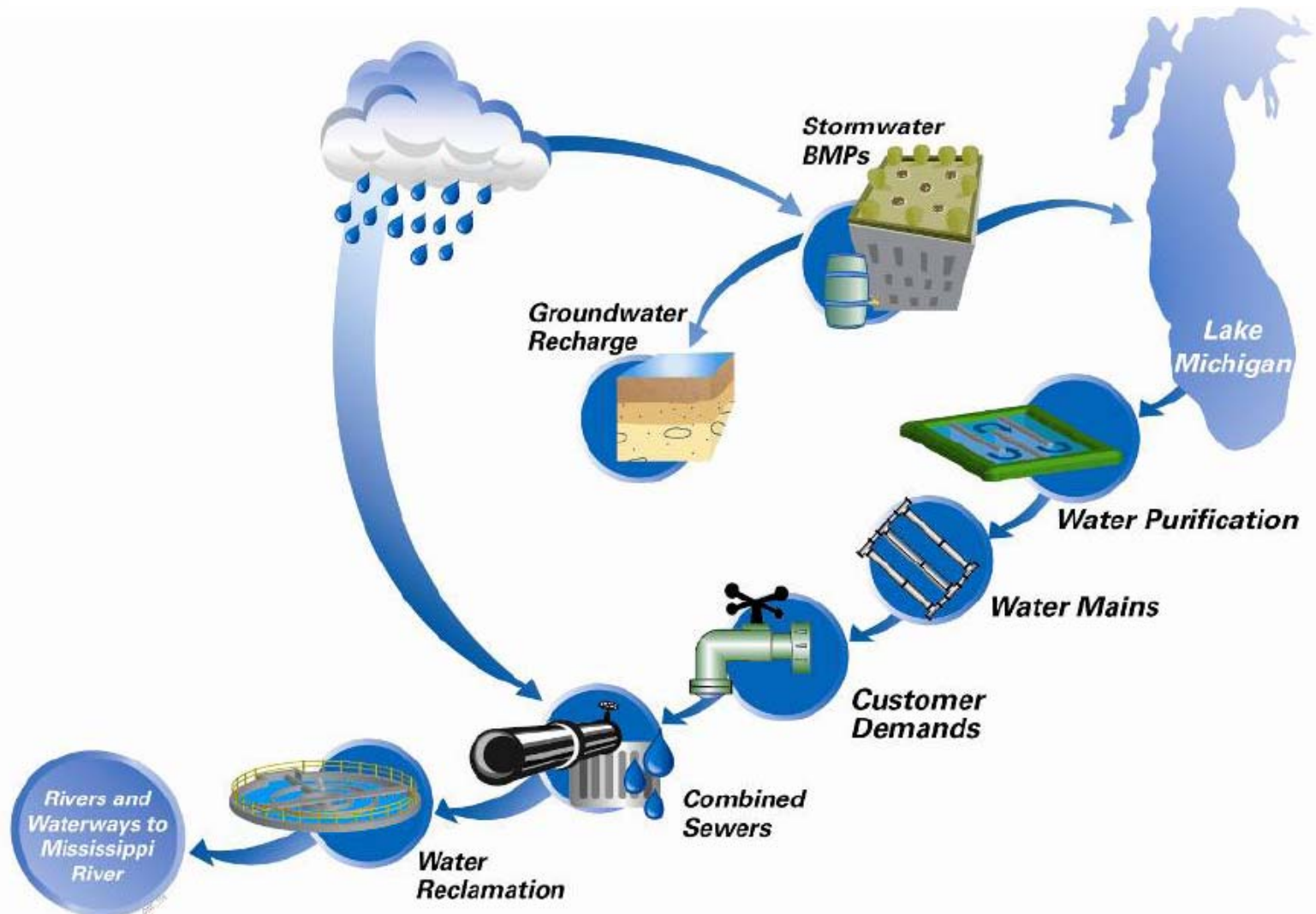
Water Conservation Strategic Plan



- The City's soon-to-be-released Water Conservation Strategic Plan sets even more aggressive goals:
 - Significantly decrease water pumpage from year 2000 with goals for 2015 and 2024
 - Retain stormwater by significantly increasing the amount of pervious surface area each year through 2015



Integrated Approach





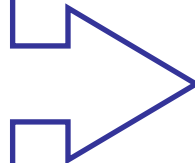
Benefits of Water Conservation

to the Region

- **Regional Benefit:** The region is projected to grow by 1 million people—thus creating a need for additional water
- **Conserve water in advance of climate change:**

CLIMATE CHANGE IMPACTS

- ↑ temperature
- ↑ storm intensity
- ↓ lake levels



CONSERVING WATER HELPS

- reduce carbon footprint
- use less energy
- help maintain lake levels

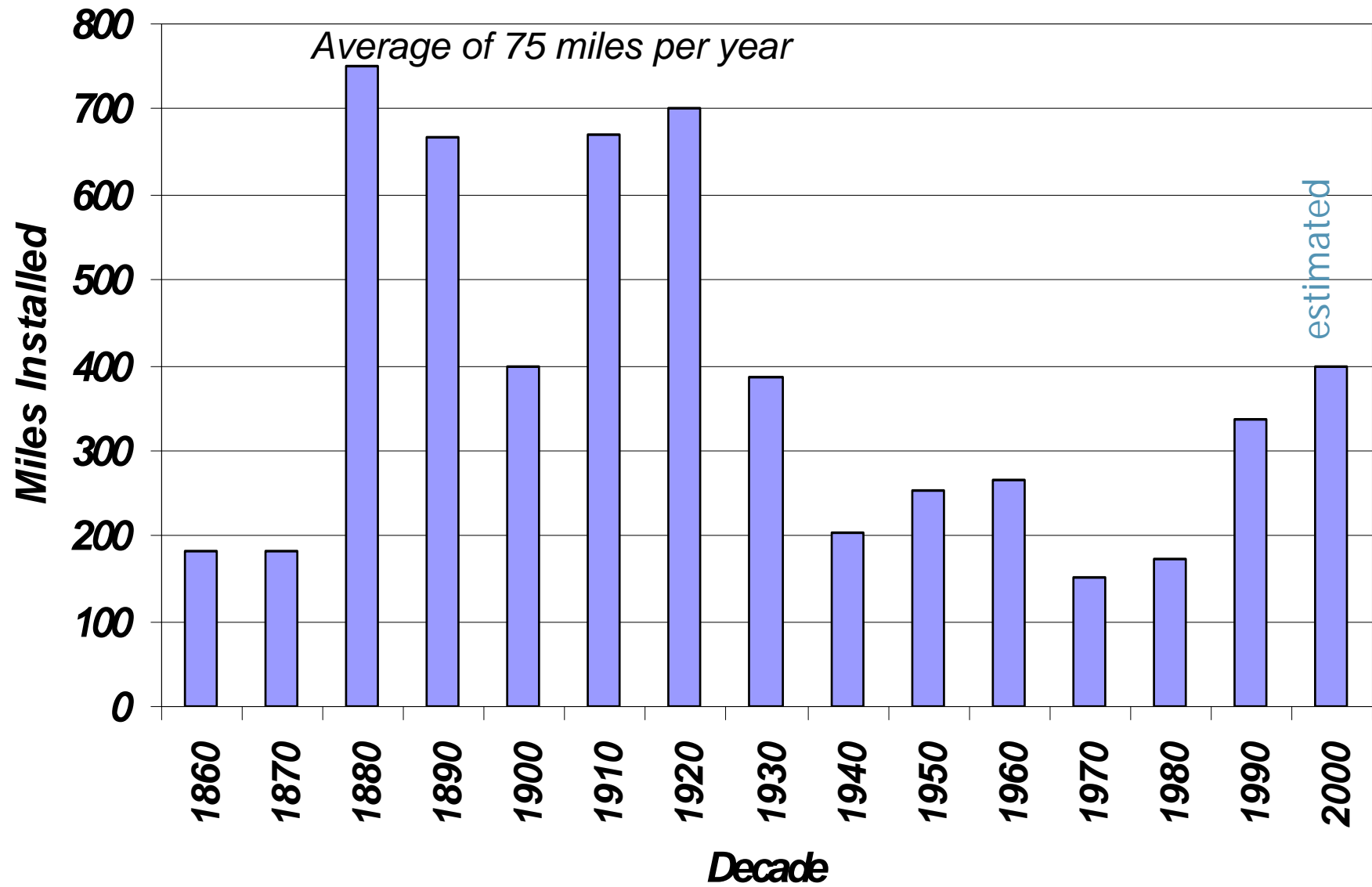




How will we address these new goals?

- Water Main Replacement
- Underground Leak Detection & Repair
- MeterSave Volunteer Meter Installation Program
- Hydrant Custodian Installation
- Pressure Management
- Facilities Inside & Outside Conservation
- Education & Public Awareness
- Stormwater Management

Chicago Water Main Installation by Decade





Water Main Replacement

- **Largest source** of water wastage
- 4,230 miles of water mains
- Over 600 miles of water mains 16 to 60 inch diameter
- Caretakers of an aging water system
- Recently completed a GIS of our distribution system which allows us to have the tools to manage our replacement program and develop long term strategic goals as well as our near term CIP





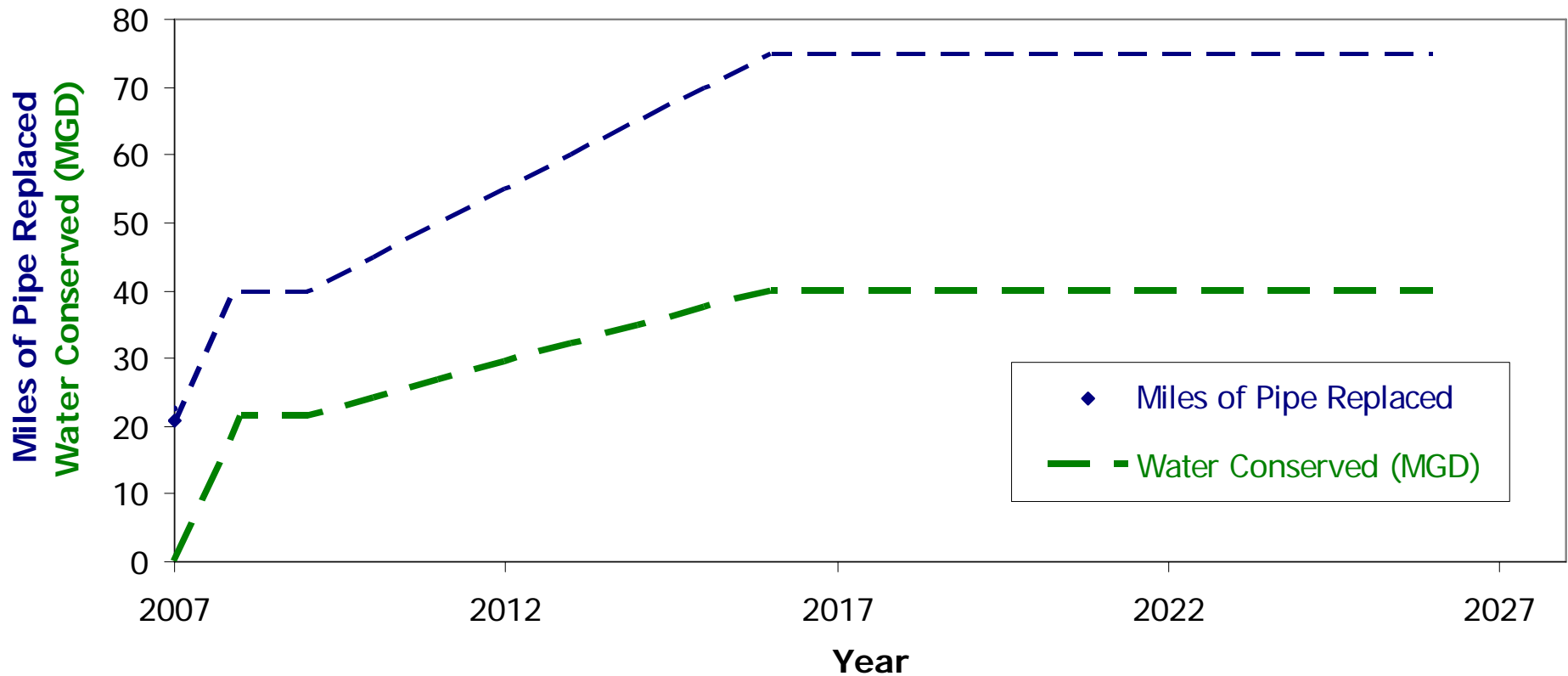
Replacing Aging Infrastructure

- More water is conserved as aging pipes are replaced
- Ramp up main replacement to 75 mi/yr
- Mirrors original installation rate (1890 - 1930's)
- 100 yrs later, mains are coming upon end of their useful life
- ◆ Expect to save **40 million** gallons of water per day by 2016
- ◆ Provides enough water for **400,000 additional people** by the end of the program

**A 36" main break
can leak
10 million gallons**



Replacing Aging Infrastructure





Underground Leak Detection and Repair



- Goal to survey 2,000 miles per year
- Yielding between 400 to 900 leaks/year
- Using "state of art" leak correlators
- Permalog leak detection technology
- Radcom SoundSens leak correlation technology
- Echologics –LeakFinder RT

TriCorr Leak Correlator



Permalog Connection



LeakFinder RT




Radcom SoundSens Correlator (below)





Volunteer Meter Installation

MeterSave program

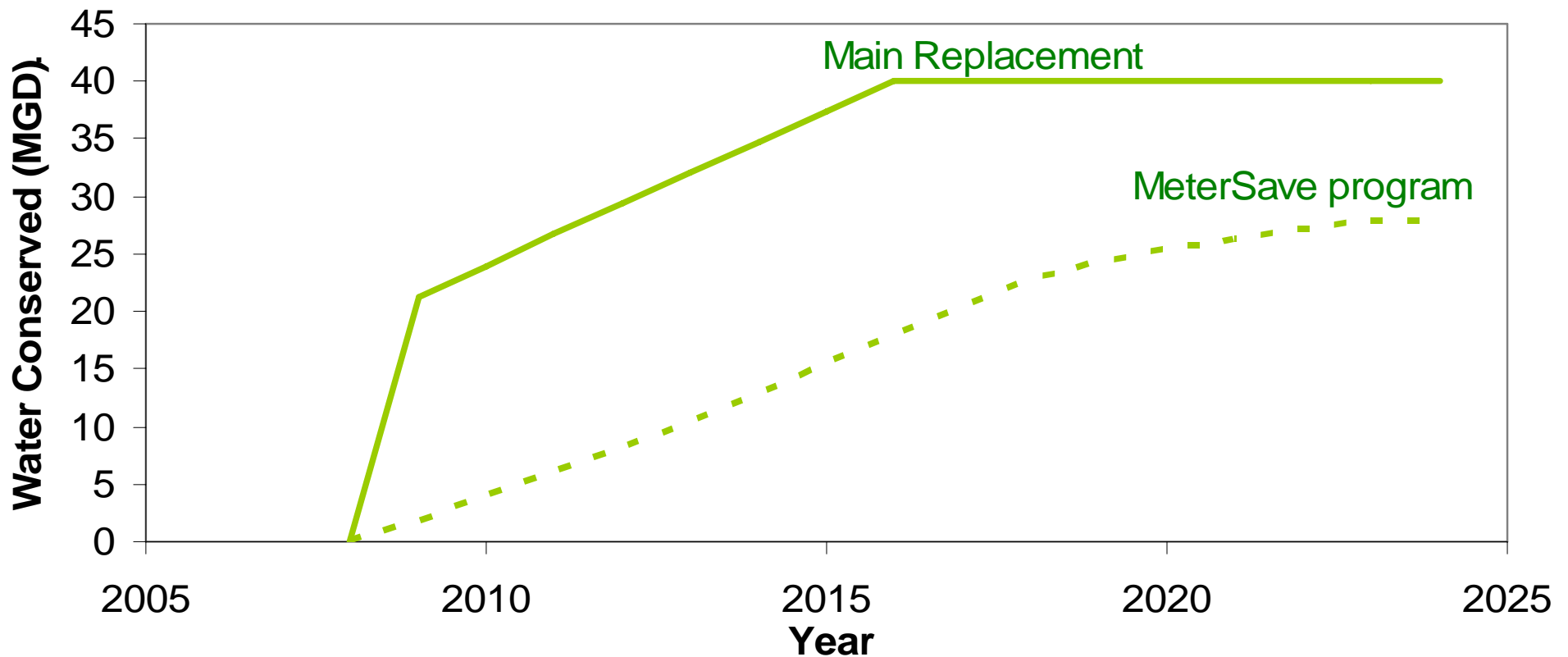
- Installing meters on single family & 2-flats (majority are non-metered)
- By becoming aware of their water usage, people will conserve, eliminate waste, & fix leaks
- Based on results in other large cities, the avg. customer's bill will  by 17-33%
- Customer will get either an inside or outside conservation kit
- ◆ Expect to save **30 million** gals of water per day upon completion
- ◆ Provides enough water for **300,000 additional people** by the end of the program





Volunteer Meter Installation

MeterSave program



Hydrant Custodian Installation





SCADA System and Variable Speed Pumping Units



- SCADA allows the ability to monitor water pressures at nearly 100 points throughout the distribution system
- Variable speed motors allow better pressure management = reduction in water usage



Building Facilities Conservation

- Indoor Best Practices
 - New building codes meeting the Federal Energy Act of 1994
 - Low-flow fixtures - waterless urinals at City Hall
 - Shut off valves in parks
- Outdoor Best Practices
 - Landscape rebate program
 - Soil depth initiative
 - Sprinkling ordinance
 - Rain Barrels & Cisterns





Outreach

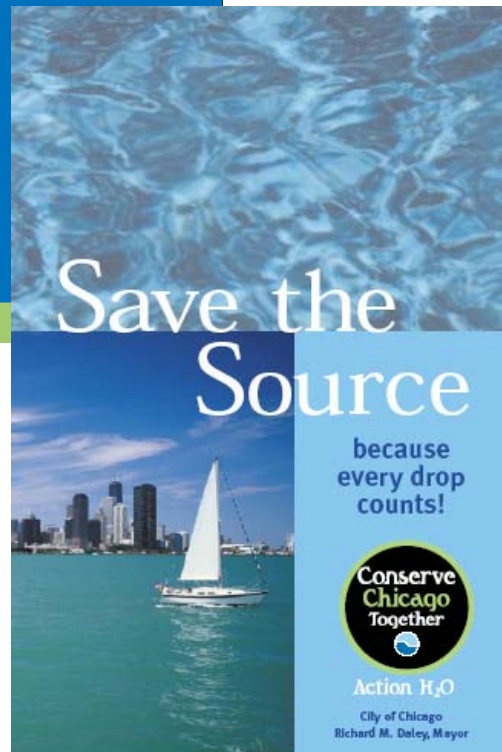
- Brochures & Publications
- Community Meetings & Events
- Chicago Conservation Corps
- Collaboration with schools

- Websites:

www.cityofchicago.org/Environment

www.cityofchicago.org/Environment/C3

www.cityofchicago.org/ConserveChicagoTogether





Stormwater as a Resource

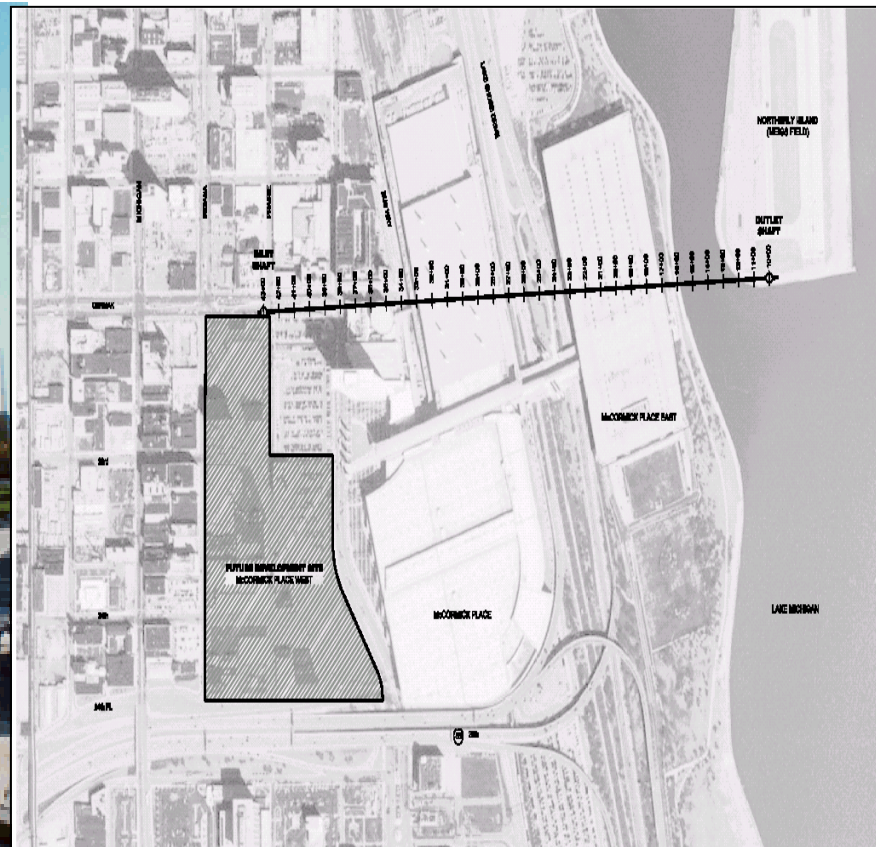
Why rethink stormwater?

- Global trend is toward sustainable design/green infrastructure
- Makes economic sense
 - pay to treat
 - pay to pump
- Direct conservation measure - keeps water in the Great Lakes basin





67 acres of rooftop drainage
3,400 foot tunnel – 160 feet deep to Lake Michigan
approximately 55 million gallons per year





Questions & Answers

